region contains 405 species, or 60 per cent., and of these 82, or 12 per cent., are special. Lastly, the fourth region contains 291 species, or 42 per cent., and of these 126, or 18 per cent. are found in it only. No fewer than 18 of these are found in the basalt of the lesser Schneegrube, which Stein calls the "El Dorado of Lichenologists," as 16 of them are not met with elsewhere.

Stein defines lichens as being those thallophytes in which the thallus exhibits a union of gonidia, threads or hyphæ and chlorophyll-bearing, or phycochromaceous cells, or gonidia, the fruit-body containing the spores in asci. The structure of the thallus is described in full, as well as that of the reproductive organs, the spermogonia and apothecia. Spermogonia, now recognised as the male reproductive organs, have been met with in most lichens, but are as yet unknown in the genera Solorina, Myriangium, and Siphula. Usually spermogones and apothecia occur in the same plant, lichens being thus mostly monœcious, but occasionally the two kinds of organs are on different plants, as in *Ephebe pubescens*, which is diœcious. The origin of the apothecium from the ascogonium and carpogonium is described from the observations of Stahl, and the non-sexual reproduction by the pycnides with their stylospores or conidia, is also mentioned, while the formation of soredia is described as spontaneous division of the thallus. Most lichens produce soredia, and we may form a new plant, or several may unite together to form a single new thallus. The structure of the gymnocarpic apothecium with its four layers, the hymenium, sub-hymenium, hypothecium and excipulum, is detailed in full.

The division of the lichens into subordinate group calls for no remark, while to assist the student a very good analytical key to the genera is given, occupying no less than seven pages. In the description of the species the chemical reactions are given, but Stein seems very wisely to reject all species *only* recognisable by chemical tests, *i.e.*, without some structural character.

W. R. McNAB

OUR BOOK SHELF

Blowpipe Analysis. By J. Landauer. Authorised English Edition, by James Taylor and William E. Kay. (London: Macmillan and Co., 1879.)

THE writer of this treatise, as appears from his preface, has designedly restricted its scope by omitting all reactions peculiar to minerals, on the ground that most works already in existence upon the subject treat the mineralogical part in great detail, and devote comparatively little attention to its chemical aspects. This resolution is unfortunate, as the principal justification for the systematic teaching of blowpipe analysis is to be found in the facility thereby acquired in the identification of the constituents of minerals by simple means when the resources of a complete laboratory are not at hand; and by omitting all characteristic mineral reactions the interest of the work is decidedly lessened. Within these restricted limits, however, the book is a very good one and likely to be useful to students in chemical laboratories as an adjunct to the ordinary text-books on analysis, and this utility will be increased by the chapter on Bunsen's flame reactions, which have for many purposes replaced the older methods of investigation. The matter is condensed in a fashion rather unusual in works of German origin, and the arrangement is good though somewhat troublesome to use, on account of the adoption of a double system of numeration by pages and paragraphs. Neither author nor translators have, however, paid sufficient attention to the necessity, or at any rate desirability, of properly proportioning the different parts of the blowpipe. In this respect the examples figured are to be avoided, as they are far too narrow in the tube to be used with anything like comfort. We should also be disposed to give the first instead of the second place to the Plattner oil-lamp when compared with the gas-flame. The latter is undoubtedly more convenient, as saving the trouble of trimming and cleaning; but for all accurate work a good lamp or even a candle flame is generally preferable as being more readily controlled than gas. A self-acting blowpipe on the principle of the Sommellier compressor made with two bottles, a length flexible tube, and a gallon of water described on p. 5, deserves notice for its ingenuity, but such contrivances are not to be recommended in practice, for they are, to quote the words of a leading American mineralogist, "unnecessary when the student has sufficient enterprise to learn to blow the ordinary instruments, and no others will be likely to make much progress in blowpipe analysis."

The Zoological Record for 1877; *being Volume Fourteenth of the Record of Zoological Literature.* Edited by E. C. Rye, F.Z.S. (London: Van Voorst, 1879.)

IT is now just fifteen years ago since the project of the *Zoological Record* was first started by Dr. Günther. The difficulties of the undertaking were many, the labour was great, the reward uncertain. It would seem a proof, however, of there being a necessity for such a publication when we find it still pursuing the even tenour of its way, under the auspices at present of an association, and favoured by considerable money grants from the Royal Society, the British Association, and the Zoological Society of London. The original staff of recorders have now all but Dr. von Martens ceased from their recording labours and a younger generation takes their place.

The pagination is now, we observe, of a new, perhaps of a more scientific, but certainly of a puzzling type, each class having a pagination to itself, so that the sequence of the classes has first to be learnt and then only can one find the object looked for; that this may be a convenience to the printer we acknowledge, but we do not think it a commendable plan. We confess too that we like the method still adopted by some of the older recorders, of giving first a list of the more important publications in a group, then an account of the works on the anatomy and embryology of the same, next the contributions to faunas, and lastly, the new forms, &c., under their orders and families. To say the least the editor would consult the convenience of the student if he would suggest an uniformity in practise in these particulars to his staff. Thus making all due allowance for the difficulties in the way of classifying the Vermes, yet the manner in which the new genera and species are recorded makes it rather difficult to find out what has been done in this group during 1877. The editor too, for he alone could do it, might have added to the last paragraph but one treating of the worms, a reference to "Moll. 55," where pretty much the same facts are stated as we find recorded in "Verm. 21." Amid such a quantity of matter it would be simply an impossibility that mistakes should not sometimes occur, and indeed on a careful survey of this volume such have very rarely turned up. In "Ech. 5" we may remark that the notes by "G. McIntosh" referred to should be credited to H. W. Mackintosh, probably not even a relation of the person named. In "Cœl. 13" is not *Cylicozoa* a misprint for Calycozoa? At "4 Spong." we read, "Gen. *Ceratella*, Gray, and *Dihitella*, Gray, are undoubtedly the same genus, *C. labyrinthica*, sp.n. (*vide infrà*)" (why is the accent always on this *a*). We have looked both below and

© 1880 Nature Publishing Group

above and yet have found nothing more about this new species. Has not H. B. Brady's paper, "On some Foraminifera from the Loochoo Islands" (*Proc.* R.I.Ac., vol. ii. n.s. p. 589) been overlooked by the recorder of the Protozoa? Perhaps Ross, F. O., "Myology of the Cheetah" (*Felis jubata*), in the same *Proceedings*, vol. iii. n.s., part 3, August, 1877, was also worthy of a reference. Other papers are quoted from these same *Proceedings*, which it is true contain little that is zoological. Without a wish to start a controversy as to the reproducing the Greek κ by the English *c*, we venture to think that a little discretion might be allowed to authors in this matter.

In concluding this notice we thank, in common with all zoologists, the editor for the volume he has published, and we wish a long and prosperous life to the association of which he is the officer, an association which deserves every possible assistance from those interested in the subject of zoology.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.*]

Sunshine Cycles

PROF. PIAZZI SMYTH in his letter headed as above to NATURE (vol. xxi. p. 248) has given us the latest information regarding those variations of temperature indicated by the Edinburgh earth thermometers, commonly termed "waves of heat and cold." He has, however, cited but one case in which an extraordinary amount of sunshine was actually observed to occur simultaneously with the crest of a heat-wave, viz., in 1826.

Having lately been engaged upon a comparison of the annual and seasonal amounts of cloud in different parts of Europe, I think I can bring forward some evidence to show that these waves of heat and cold are indeed veritable cycles of sunshine and gloom.

Before proceeding to give proofs of this statement, however, it will be necessary to consider for a few moments the effects that most probably attend a prevalence of cloud or the reverse at different seasons of the year. It is, I imagine, pretty generally allowed that presence of cloud in the summer is associated with coolness and in the winter with warmth; and in like manner that clear skies which in the summer by promoting solar radiation favour the development of great heat, in the winter by giving free scope to terrestrial radiation (in the then comparatively reduced stage of solar radiation) tend to produce excessive cold.

A warm year need not therefore be a *very* cloudless year, provided the majority of its cloud occurs during the cooler months. In like manner a cold year need not be *very* cloudy, provided its clear sunshiny days occur mostly in the winter, or when the solar altitude is small.

It must, however, be noted that the effects of the presence or absence of cloud are not of equal *magnitude* at the summer and winter solstices respectively. At and near the former epoch the temperature of the extra-tropics is more dependent on the direct solar rays, and anything which intercepts these produces a more marked effect than at the latter epoch, when the prevailing direction of the wind becomes the predominating factor.

If, then, any general relation with respect to cloudiness be visible in the mean annual results, at the epochs of greatest heat and cold as given by Prof. Smyth, the results for the summer seasons alone, should exhibit the *same* relation but in a more marked degree.

The following tables have been prepared from the limited data at my disposal, with especial reference to the foregoing considerations.

They comprise the following observations:—

1. The relative monthly and annual mean cloud proportions at Greenwich from 1841 to 1876, and at Oxford from 1850 to 1875, as supplied to me by Mr. Whipple, of the Kew Observatory.

2. Do. at Munich from 1843 to 1866, as summarised by Dr. J. Lamont in the "Monatliche und jährliche Resultate der an der königlichen Sternwarte bei München von 1843 bis 1866 angestellten meteorologischen Beobachtungen."

3. Do. at Breslau, as given by Dr. J. Galle in a similar work.

4. The results of the tri daily observations at Leipzig from 1830 to 1859, and for the summer months at Münster from 1858 to 1874 ("Ueber die Beziehungen der Sonnenfleckenperiode zu meteorologischen Erscheinungen," von Dr. F. G. Hahn. Leipzig, 1877, pp. 123-126).

5. The annual number of cloudy days (giorni nuvoli) at Bologna from 1814 to 1858 ("Notizie sul clima Bolognese, etc., nel quaranta cinquennio 1814–1858," by Prof. L. Respighi).

6. The number of days on which Schwabe was unable to observe the sun at Dessau in each year, from 1826 to 1859.

7. The number of days on which neither Prof. Wolf nor his assistant could observe the sun at Zurich from 1859 to 1877 ("Ueber die Beziehungen der Sonnenfleckenperiode zu den met. und mag. Erscheinungen der Erde," von H. Fritz. Haarlem, 1878, p. 212).

The figures in every case denote the difference from the corresponding mean, but those for Greenwich, Oxford, Munich, and Breslau only, are intercomparable.[1]

TABLE I.—*Mean Annual Cloud.*

Piazzi Smyth's dates for the crests of heat-waves.	Years.	Greenwich.	Oxford.	Munich.	Breslau.	Bologna. diff. from yearly mean.	Leipzig. diff. from yearly mean.
1826·5	1826	—	—	—	—	− 2	—
1834·5	1834	—	—	—	—	−38	− 78
1846·4	1846	+0·2	—	−0·43	—	+18	− 21
1857·9	1857	−0·1	−0·2	−0·03	−0·8	− 5	−151
1868·8	1868	−0·6	−0·2	—	−0·1	—	—
Means ...	...	−0·1	−0·2	−0·25	−0·4	− 6	− 83
Dates for the crests of cold-waves.							
1829·6	1829	—	—	—	—	+ 8	+ 45
1837·3	1837	—	—	—	—	−17	+ 37
1845·2	1845	−0·1	—	+0·10	—	+10	+ 9
1848·0	1848	+0·2	—	−0·23	—	+ 8	+ 16
1855·8	1855	+0·3	+0·2	+0·50	±0·0	+13	+ 2
1860·3	1860	+0·6	+0·7	+0·70	+0·6	—	—
1866·3	1866	+0·3	±0·0	−0·10	+0·1	—	—
1870·3	1870	−0·6	−0·5	—	±0·0	—	—
1879·1	—	—	—	—	—	—	—
Means ...	...	+0·1	+0·1	+0·1	+0·1	+ 5	+ 21

TABLE II.—*Summer Cloud.*

Years.	Greenwich.	Oxford.	Munich.	Breslau.	Leipzig.	Münster.
1826	—	—	—	—	—	—
1834	—	—	—	—	−16	—
1846	−0·38	—	−1·35	−0·8	−15	—
1857	−1·08	−0·75	−0·70	−0·5	−25	—
1868	−1·45	−0·95	—	—	—	−18
Means	−0·97	−0·85	−1·07	−0·6	−18	−18
1829	—	—	—	—	+21	—
1837	—	—	—	—	− 3	—
1845	−0·25	—	+0·25	—	− 3	—
1848	+0·59	—	±0·0	—	+21	—
1855	−0·28	+0·41	+0·15	+0·1	− 2	—
1860	+1·45	+1·71	+0·68	+0·9	—	+14
1866	+0·49	+0·38	+0·38	+0·8	—	+ 1
1870	−0·31	−0·62	—	+0·4	—	+ 9
Means	+0·28	+0·47	+0·29	+0·55	+ 6	+ 8

[1] Those for Munich and Breslau originally given on the scale of 0–4 have been converted to the ordinary scale of 0–10.

© 1880 Nature Publishing Group